

**CALIFORNIA ENERGY COMMISSION**

1516 Ninth Street  
Sacramento, California 95814

Main website: [www.energy.ca.gov](http://www.energy.ca.gov)



In the matter of:	)	Docket No. 08-IEP-1B
	)	
Preparation of the	)	NOTICE OF STAFF WORKSHOP
<i>2008 Integrated Energy Policy Report</i>	)	
<i>Update and the 2009 Integrated Energy</i>	)	
<i>Policy Report</i>	)	

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## Notice of Staff Workshop: Impacts of Higher Levels of Renewables on the Electricity System – Summary of Recent Studies

In support of the *2008 Integrated Energy Policy Report Update (2008 IEPR Update)*, the California Energy Commission staff will conduct a workshop concerning analysis of physical, operational, and market changes necessary for California's electric system to support a minimum of 33 percent renewables by 2020. The Integrated Energy Policy Report (IEPR) Committee with Commissioner Jeffrey Byron as Presiding Member and Chairman Jackalyne Pfannenstiel as Associate Member oversees this work. While this is a staff workshop, Commissioners from the Energy Commission may attend and participate in this workshop. Commissioners and staff from the California Public Utilities Commission may also attend and participate.

The workshop will be held:

**MONDAY, JULY 21, 2008**  
10 a.m.  
CALIFORNIA ENERGY COMMISSION  
1516 Ninth Street  
First Floor, Hearing Room A  
Sacramento, California  
(Wheelchair Accessible)

Audio from this meeting will be broadcast over the Internet.

For details, please go to: [www.energy.ca.gov/webcast](http://www.energy.ca.gov/webcast)

To participate in the meeting by phone,  
please call 888-566-5914 by 10 a.m.

Passcode: **IEPR** Call Leader: **Suzanne Korosec**

**PLEASE NOTE:** If you are planning to attend this meeting, please be aware that there may be traffic congestion and delays due to repair work on Interstate 5 in the downtown Sacramento area. Information on road closures and alternate routes is available at the Fix I-5 website at [www.fixi5.com](http://www.fixi5.com) or call 5-1-1 to receive information in English and Spanish.

## Purpose

The purpose of the workshop is to seek public comment regarding key issues that need to be addressed to support higher levels of renewable energy in California, specifically 33 percent renewable by 2020. There are a number of existing and ongoing studies that examine how the 2020 electricity system could be structured to accommodate higher levels of renewable generation.

This workshop will summarize findings from existing reports (listed in Attachment A) on the following topics and seek input regarding additional studies related to these issues that are underway or planned:

- Impacts of contract delays or cancellations on meeting Renewable Portfolio Standard goals.
- Potential wholesale and retail price impacts (positive or negative) and strategies to mitigate negative impacts.
- Operational and physical changes needed to integrate renewables while maintaining reliability, including discussion of when those changes would be needed and at what level of renewable penetration, the need for energy storage technologies, and the impacts of using peaker plants.
- Potential impacts on natural gas demand, supply, and price.
- Environmental concerns with developing large-scale renewable facilities and mitigation strategies.

The goals of this staff workshop are to (1) identify the relevant issues that should be considered for analyzing changes needed to achieve 33 percent by 2020; (2) evaluate strategies to address any potential barriers to meet this objective; and (3) identify the associated uncertainties. Staff is particularly interested in public input regarding the discussion questions listed in Attachment B.

This workshop is the first of three staff workshops planned to address these topics. The second workshop will seek comment on the sufficiency of existing initiatives in removing the major transmission barriers associated with higher levels of renewable penetration (July 23). The third workshop will focus on research and development needs and enabling technologies for integration of high levels of renewable energy into the electricity system (July 31).

The IEPR Committee plans to hold a Committee workshop on achieving higher levels of renewables in California's electricity system on August 21, 2008. The IEPR Committee will consider public feedback from this series of workshops in their recommendations for further studies and analyses that will be needed on this topic in the *2009 IEPR*.

## Background

Public Resources Code Section 25300, et seq., directs the Energy Commission to develop the IEPR every two years, with updates in the intermediate years, and directs state government entities to carry out their energy-related duties and responsibilities using the information and analyses contained in the adopted IEPR reports.

California currently has a mandate to achieve 20 percent of retail electricity sales from renewable resources by 2010, and the Governor and the state's energy agencies have identified a further goal of 33 percent renewable by 2020. This higher goal is a key strategy for meeting the state's greenhouse gas emission reduction targets.

The IEPR Committee issued its Committee Scoping Order for the *2008 IEPR Update* on May 15, 2008. One of the topics identified in that order is to identify how the 2020 electricity system could be structured to accommodate higher levels of renewables. Analysis and evaluation on this topic will continue in the *2009 IEPR* as well.

## Written Comments

Written comments on the attached questions and workshop topics must be submitted by 5 p.m. on Friday, August 1, 2008. Please include the docket number **08-IEP-1B** and indicate "**2008 IEPR Update – 33 Percent Renewable Electricity**" in the subject line or first paragraph of your comments.

The Energy Commission encourages comments by e-mail. Please include your name or organization in the name of the file. Those submitting comments by electronic mail should provide them in either Microsoft Word format or as a Portable Document File (PDF) to [docket@energy.state.ca.us](mailto:docket@energy.state.ca.us). **One paper copy** must also be sent to the Energy Commission's Docket Unit at the address shown below.

Parties may also submit comments in hard copy. Please hand-deliver or mail an original plus 10 paper copies to:

California Energy Commission  
Dockets Office, MS-4  
Re: Docket No. 08-IEP-1B  
1516 Ninth Street  
Sacramento, CA 95814-5512

Participants may also provide an original and 10 copies at the beginning of the workshop. All written materials relating to this workshop will be filed with the Dockets Unit and become part of the public record in this proceeding.

## **Public Participation**

The Energy Commission's Public Adviser, Elena Miller, provides the public assistance in participating in Energy Commission activities. If you want information on how to participate in this forum, please contact the Public Adviser's Office at (916) 654-4489 or toll free at (800) 822-6228, by fax at (916) 654-4493, or by e-mail at [pao@energy.state.ca.us](mailto:pao@energy.state.ca.us). If you have a disability and require assistance to participate, please contact Lou Quiroz at (916) 654-5146 at least five days in advance.

The service list for the *2008 IEPR Update* and associated key topic proceedings is handled electronically. Notices and documents for these proceedings are posted to the Energy Commission website at [www.energy.ca.gov/2008\\_energypolicy/index.html](http://www.energy.ca.gov/2008_energypolicy/index.html). When new information is posted, an e-mail will be sent to those on the energy policy e-mail list server. We encourage those who are interested in receiving these notices to sign up for the list server through the website [www.energy.ca.gov/listservers](http://www.energy.ca.gov/listservers).

Please direct all news media inquiries to the Media Office at (916) 654-4989, or by e-mail at [mediaoffice@energy.state.ca.us](mailto:mediaoffice@energy.state.ca.us). Technical questions should be directed to Suzanne Korosec, Assistant Director for Policy Development, at (916) 654-4516 or by e-mail at [skorosec@energy.state.ca.us](mailto:skorosec@energy.state.ca.us).

Note: California Energy Commission's formal name is State Energy Resources Conservation and Development Commission.

## Attachment A - Impacts of Higher Levels of Renewables on the Electricity System – Summary of Recent Studies

	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7
<b>Title of Study</b>	<b>Energy (GWh/yr)</b>	<b>Resource Mix Scenarios</b>	<b>Contract Delays and Cancellations</b>	<b>Range of Costs and/or Retail Price Impacts</b>	<b>Operational and Physical Changes for Electrical System</b>	<b>Potential Impacts on Natural Gas Demand, Supply, Price</b>	<b>Environmental Concerns and Mitigation</b>
California Air Resources Board, Feb 2008, Recommendations of the Economic and Technology Advancement Advisory Committee (ETAAC) FINAL REPORT.					X		
California Energy Commission, 2005, Strategic Value Analysis [cost data reports]				X			
California Energy Commission, Nov 2006, A Roadmap for the Development of Biomass in California: Draft Roadmap Discussion Document. PIER Collaborative Report.							X
California Energy Commission, July 2007, <i>Intermittency Analysis Project Final Report</i>	X	X		X	X		
California Energy Commission, 2007 Environmental Performance Report, Final Staff Report publication							X
California Energy Commission, Dec 2007, Comparative Costs of California Central Station Electricity Generation Technologies, Final Staff Report.				X			
California Energy Commission, October 2007, California Guidelines for Reducing Impacts to Birds and Bats From Wind Energy Development - Final Commission Report							X

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Title of Study	Energy (GWh/yr)	Resource Mix Scenarios	Contract Delays and Cancellations	Range of Costs and/or Retail Price Impacts	Operational and Physical Changes for Electrical System	Potential Impacts on Natural Gas Demand, Supply, Price	Environmental Concerns and Mitigation
California Energy Commission, 2008 (forthcoming), Scenario Analyses of California's Electricity System: Final Results for the 2007 Integrated Energy Policy Report, Final Staff Report	X	X		X	X	X	
CA ISO, Nov 2007, <i>Integration of Renewable Resources</i>					X		
CA ISO, 22-May-2008, White Paper - Integration of Energy Storage Technology					X		
Consortium for Electric Reliability Technology Solutions (CERTS), July 2005. "Assessment of Reliability and Operational Issues for Integration of Renewable Generation."					See July 23 IEPR Staff Workshop on Transmission		
Consortium for Electric Reliability Technology Solutions (CERTS), forthcoming 2008.					See July 23 IEPR Staff Workshop on Transmission		
CPUC, Nov 2005, <i>Achieving a 33% Renewable Energy Target</i> , by CRS for the CPUC	X	X	X	X	X		
CPUC, Decision 07-12-052 052, Long-Term Procurement Plans.	IOUs only	X	X	X	X		
CPUC, Reports to the Legislature [RPS, Contracts]	X		X				

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	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7
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Geothermal Energy Association, April 2007, A Guide to Geothermal Energy and the Environment, by Alyssa Kagel, Diana Bates, & Karl Gawell.							
E3, 2008 (forthcoming), CPUC GHG Modeling	X	X		X			
Memorandum of Understanding Between the U.S. Dept Of The Interior, BLM California Desert District and the California Energy Commission Staff Concerning Joint Environmental Review for Solar Thermal Power Plant Projects							See July 23 IEPR Staff Workshop on Transmission
Lamont, Alan D. April 2007. Assessing the long-term system value of intermittent electric generation technologies						X	
RETI, 2008, (Phase 1a)				See July 23 IEPR Staff Workshop on Transmission			See July 23 IEPR Staff Workshop on Transmission
RETI, 2008 (forthcoming)	See July 23 IEPR Staff Workshop on Transmission	See July 23 IEPR Staff Workshop on Transmission		See July 23 IEPR Staff Workshop on Transmission	See July 23 IEPR Staff Workshop on Transmission		See July 23 IEPR Staff Workshop on Transmission
US. DOE, EERE, May 2004, Geothermal Literature Assessment: Environmental Issues							X

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	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7
Title of Study	Energy (GWh/yr)	Resource Mix Scenarios	Contract Delays and Cancellations	Range of Costs and/or Retail Price Impacts	Operational and Physical Changes for Electrical System	Potential Impacts on Natural Gas Demand, Supply, Price	Environmental Concerns and Mitigation
US DOE, EERE, May 2008, 20% Wind Energy by 2030 Increasing Wind Energy's Contribution to U.S. Electricity Supply, DOE/GO-102008-2567, May 2008				X	X		
US DOE NREL, Feb 2008, PV Production Cost Modeling				X			
Wiser, Ryan and Mark Bolinger. 2005. Can Deployment of Renewable Energy and Energy Efficiency Put Downward Pressure on Natural Gas Prices						X	
Wiser, Ryan and Mark Bolinger. "Annual Report on U.S. Wind Power Installation, Cost, and Performance Trends: 2007				X	X		



**Attachment B:**  
**Questions for Staff Workshop on Impacts of Higher Levels of Renewables  
on the Electricity System – Summary of Recent Studies**

There is a degree of uncertainty regarding how the electricity and supporting infrastructure may develop over time, which will affect the implications of alternative development strategies for achieving 33 percent renewables by 2020. For example, once-through cooling concerns and greenhouse gas emission policies may require a number of existing generation facilities to be replaced. The fuel and development costs for these different generation technologies may also vary over time to alter scenario economics. Given the range of uncertainty for these relevant factors, a rigorous study of the electricity system will require an examination of different renewable and conventional generation mixes to ensure system stability at the least cost possible.

**SPECIFIC QUESTIONS**

1. Estimating 33 percent of statewide retail sales for 2020
  - a. Staff is assuming that the 33 percent target refers to a percentage of retail sales, as is the case with the current Renewable Portfolio Standard, and that the target will be imposed on all load serving entities in California. Are these assumptions appropriate? If not, how should the 33 percent target be determined?
  - b. If you believe the 33 percent target should be based on retail sales, do you have any comments or suggestions on how to estimate 33 percent of statewide retail sales for 2020?
2. Comparison of Resource Mix Scenarios for 33 percent
  - a. What resource mix scenarios for 2020 have been published? Please provide the reference.
  - b. Are there other resource mix scenarios that would be helpful to further understand the operational, physical, and market changes needed to accommodate 33 percent renewables?
  - c. What assumptions should be made in coming up with reasonably likely resource mixes for 2020?
3. Impacts of contract delays or cancellations on meeting Renewable Portfolio Standard goals.
  - a. Do you have any comments or suggestions regarding the impact of contract delays or cancellations on meeting Renewable Portfolio Standard goals for investor-owned utilities? Publicly owned utilities? Other load serving entities?
  - b. Do you think the current procurement process will produce 33 percent renewables by 2020?
  - c. How does California's rate of bringing new renewable energy on-line compare with that of other states and countries?

- d. What can be done to increase the rate that new renewable energy begins operation?
- 4. Potential wholesale and retail price impacts (positive or negative) and strategies to mitigate negative impacts.
  - a. Would wholesale energy costs to the utilities increase or decrease by implementing a 33 percent goal?
  - b. In your estimate, by how much would average electricity prices increase or decrease?
  - c. Would a price increase and/or decrease affect in a similar manner investor - owned utilities and publicly owned utilities?
  - d. Should all ratepayers bear the effect of an increase or share the savings of a decrease in rates?
  - e. Would the increase or decrease be implemented at once or in stages?
  - f. Given that most DWR contracts will be declining significantly in the 2010-2012 period, would the 33 percent goal substitute the high costs of Department of Water Resources contracts?
- 5. Operational and physical changes needed to integrate renewables while maintaining reliability, including an evaluation of when those changes would be needed and at what level of renewable penetration, the need for energy storage technologies, and the impacts of using peaker plants.
  - a. How do the CPUC/CAISO resource adequacy requirements treat renewable resources, and are any changes under development that would change this in the foreseeable future?
  - b. Are there additional studies completed, underway, or planned regarding operational and physical changes needed to integrate 33 percent renewables into the electricity system?
  - c. How do changes in the renewable resource mix affect the operational impacts of 33 percent renewables on the electricity system?
  - d. How much of the impact of integrating 33 percent renewables can be addressed by energy storage technologies? Pumped hydropower?
  - e. How much of the impact should be addressed by changes at the point of renewable energy generation? What changes would be most helpful?
  - f. What characteristics (e.g., start/stop and ramp rate) will back-up generation resources need to accommodate 33 percent renewables?
  - g. Could demand side management strategies or distributed generation technologies be used to reduce the impacts of integrating large amounts of renewable generation?
- 6. Potential impacts on natural gas demand, supply, and price.
  - a. What would be the net increase or decrease in natural gas demand for electricity generation by 2020 by implementing the 33 percent goal?
  - b. Are there any effects on natural gas demand for other uses in the residential, industrial or commercial sectors?

- c. Would the increase/decrease be enough to encourage or discourage applications for liquefied natural gas (LNG) facilities in the State?
  - d. There are several pipeline proposals to bring more gas to the West Coast from the Rockies, would a 33 percent goal affect those projects?
  - e. Can the goal affect any of the existing infrastructure facilities such as pipelines or compressor stations?
  - f. Given that California Imports most of its gas from outside of the state, what would be the effect on the price of gas at the California border?
  - g. Would the changes in price of natural gas be reflected in lower/higher prices to core and non-core consumers?
7. Environmental concerns with large-scale renewable facilities.
- a. Do you have any comments or suggestions regarding environmental concerns and mitigation strategies in developing large-scale renewable facilities?
  - b. Should additional environmental criteria be added to Renewable Portfolio Standard eligibility (e.g., requiring that hydro must be “low impact” to be eligible for the RPS, regardless of capacity)?
  - c. How much focus should continue on repowering existing wind facilities to reduce the environmental impacts of those facilities?

#### GENERAL QUESTIONS

- 8. Staff plans to present summaries of various existing studies (listed in Attachment A) related to achieving 33 percent by 2020 at the workshop. Are there other completed studies related to achieving 33 percent renewables by 2020 (or on higher levels of renewables in general) that should be included in this summary?
- 9. What other studies are planned or underway related to achieving 33 percent renewables by 2020 (or on higher levels of renewables in general)?
- 10. What additional studies are needed to better understand the impacts of higher levels of renewables on the system and/or to identify ways to mitigate those impacts?